



# In-Delta Storage Program

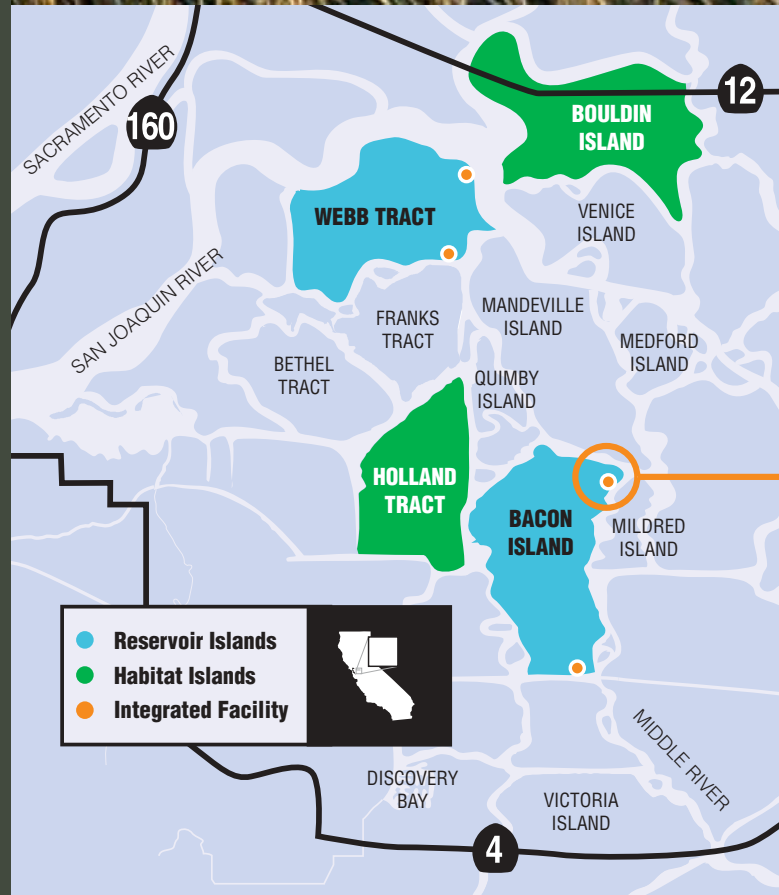
THE California Bay-Delta Authority and the California Department of Water Resources are continuing studies to develop storage in the Delta. A feasibility study of the proposed In-Delta Storage Project has been completed by DWR and the Authority. Stakeholder and public comments will provide valuable information for ongoing studies. The final feasibility study will be used to decide future actions on this project. This brochure provides basic information about the proposed project.



# BACKGROUND

The California Bay-Delta Program has identified In-Delta Storage as a potential offstream water storage project that could help meet the needs of California's growing population and provide much needed flexibility in our water system to improve water quality and support fish restoration efforts. The California Department of Water Resources and the U.S. Bureau of Reclamation worked with other implementing agencies to explore leasing or purchasing the Delta Wetlands Project, a private proposal by DW Properties Inc., or to initiate a new project if the DW Project proved cost prohibitive or technically infeasible.

In 2001, DWR and the Bay-Delta Agencies (formerly CALFED Agencies), with technical assistance from Reclamation, conducted a planning study to evaluate the DW Project and other in-Delta storage options. The study concluded that the project concepts as proposed by DW were generally well planned, but modifications and additional analyses were required for public ownership. Based on these conclusions and the recommendation of the Bay-Delta Public Advisory Committee, DWR and the Authority conducted a State feasibility study of the In-Delta Storage Project.



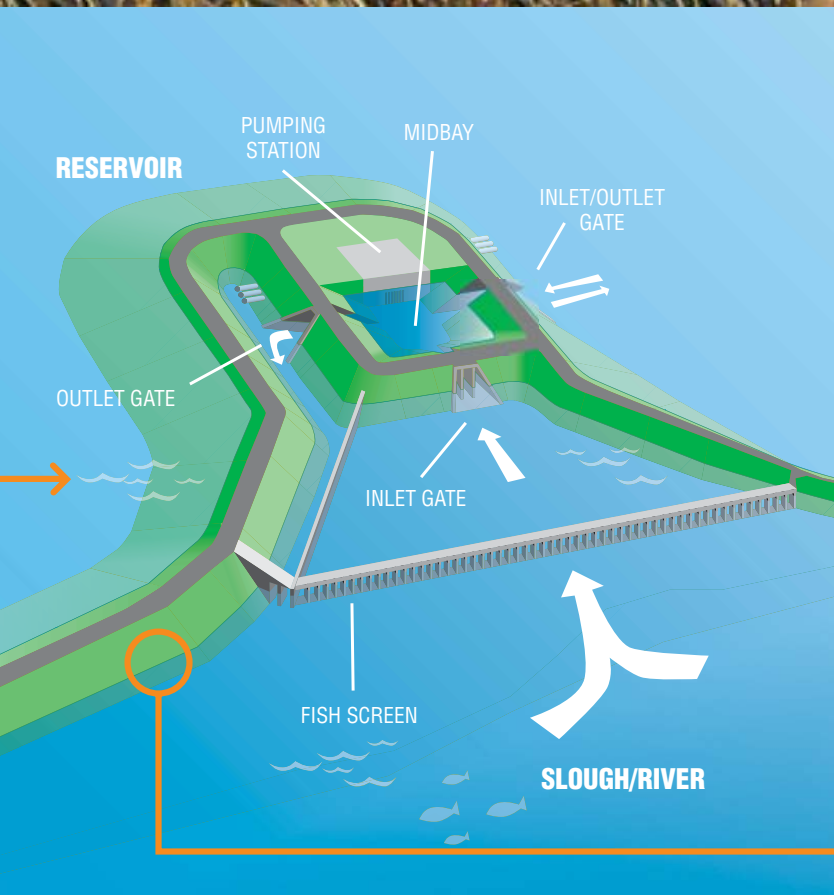
## ONE

The proposed In-Delta Storage Project consists of two reservoir islands (Webb Tract and Bacon Island), two habitat islands (Holland Tract and Bouldin Island) and four integrated facilities (two facilities on each of the storage islands).

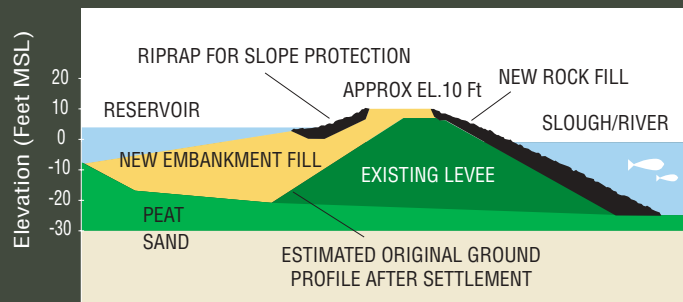
The reservoir islands would create 217 TAF of storage by strengthening existing levees and building new embankments inside the existing levees. The proposed project is similar to that proposed by Delta Wetlands over a decade ago, but would also include a new embankment design, consolidated inlet and outlet structures, new project operations and revised Habitat Management Plans.



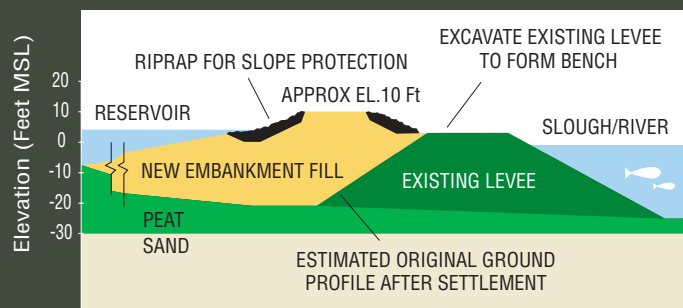
# Ita Storage Proposal



## ROCK BERM OPTION



## BENCH OPTION



## TWO

The integrated facilities would control water diversions and releases into and out of the reservoir islands. The facilities are consolidated control structures that combine all operational components needed to make diversions and releases. The components of each facility include a fish screen, a transition pool, three inlet/outlet structures, a midbay, a pumping plant and associated conduit, a bypass channel and engineered embankments.

## THREE

Two embankment configurations, the Rock Berm and Bench options, were analyzed for the reservoir islands. The Rock Berm Option would place additional rock fill on the slough side of the existing levee and add new fill to the crest and island side of the existing levee for adequate stability. The Bench Option would lower the crest of the existing levee and place new fill on the island side of the lowered crest. The recommended configuration includes combining both options to meet recommended factors of safety. Seepage wells have been proposed to prevent reservoir seepage from reaching adjacent islands.

# STUDIES

## Comprehensive Studies Completed for the State Feasibility Study

The objective of the State feasibility study is to provide technical and economic information to help determine if the In-Delta Storage Project can be implemented with an acceptable level of risk and provide water supply reliability and ecosystem restoration benefits at a reasonable cost.

The State feasibility study was taken to a level of detail such that no major changes or surprises in the project design and costs are expected as it moves into final design, construction, and operation, and such that there are no fatal flaws that would jeopardize project implementation.

To meet the objective of the State feasibility study several planning and environmental evaluations were conducted. These evaluations include geologic explorations, design of the integrated facilities, seismic and flooding analyses, embankment design, construction methods and cost estimation, risk analysis, project operations, water quality studies and environmental evaluations. Detailed documents describing each of these evaluations are available at [www.calwater.ca.gov](http://www.calwater.ca.gov).

DWR presents the findings of this study as a neutral technical evaluator of the costs, benefits, impacts, and uncertainties associated with a publicly owned In-Delta Storage Project.

## Potential Benefits of In-Delta Storage

The In-Delta Storage Project could provide a variety of benefits and contribute to meeting each of the Bay-Delta Program's four objectives for water supply reliability, water quality, ecosystem restoration, and levee system integrity.

### Water Supply Benefits

*Statewide Supplies.* The project could produce additional water deliveries to urban water users and for agricultural use.

*Carryover Storage.* Project operations could result in additional system-wide carryover storage that could benefit the cold water pool, recreation and improve the reliability of other project deliveries.

*Interim Storage for Water Transfers.* During times when there is unused storage capacity in the reservoir islands, water from upstream areas could be moved into In-Delta Storage on a temporary basis until pumping capacity at the south Delta export pumps becomes available.

*Operational Flexibility.* The project would improve the operational flexibility of the CVP and SWP. The project's strategic location within the Delta provides enhanced flexibility in responding to short-term operational needs resulting in greater environmental protection and water supply reliability.

### Water Quality Benefits

*Salinity Improvements.* The project could help reduce salinity intrusion by making releases of fresh water into the Delta. Also, it could improve export water quality by storing water when Delta inflow quality is good and salinity is low.

## The In-Delta Storage Project is a part of the California Bay-Delta Program

CALFED, a consortium of State and federal agencies, was formed in 1994 to develop and implement a long-term, comprehensive plan that restores ecological health and improves water management for beneficial uses of the Bay-Delta system. After more than five years and \$50 million of planning and environmental studies, CALFED agencies approved a long-term plan in issuing the Programmatic Record of Decision. The plan includes programs for ecosystem restoration, water use efficiency, levee system integrity, water quality, water transfer, watershed, water storage, water conveyance, and science. These programs, implemented in an integrated and coordinated manner, will work towards fixing the Bay-Delta system and meeting the California Bay-Delta Program mission.

In-Delta Storage was one of the surface storage projects identified in the CALFED ROD to be pursued with project-specific study.

In-Delta storage could contribute to the Program's mission of restoring ecosystem health and improving water supply reliability. Any future storage development in the Bay-Delta region should contribute to reducing major conflicts among beneficial uses of water and contribute to the broad Program objectives.



**Contribution to D1641 Requirements.** Although there are no additional Water Quality Management Plan (SWRCB Water Rights Decision 1641) requirements imposed on In-Delta Storage operations, coordination with the SWP/CVP is required under the CUWA/DW agreement. With this coordination both the SWP and CVP would benefit, because the In-Delta Storage Project could make water available for D1641 more quickly and efficiently than releases from upstream reservoirs.

### Ecosystem Benefits

**Environmental Water Account (EWA).** The project could provide water needed to support the EWA program, enhancing the EWA ability to respond to real-time fisheries needs and would eliminate the need to purchase a substantial portion of water needed by EWA each year.

**Ecosystem Restoration Program (ERP) Delta Flows.** Releases from In-Delta Storage could help meet spring pulse flows proposed in the ERP. The Project could also provide additional water quality and aquatic habitat improvements by releasing carryover water saved in island storage. This water could be released at strategic times during fall and winter for environmental benefit.

**Wildlife Refuges.** In some years, additional water supplies are not needed by urban water users. This water could be re-allocated to federal wildlife refuges. In-Delta Storage could provide water for supplies (in addition to Level 2 refuge supply) to meet CVPIA Level 4 refuge demand. This would benefit CVPIA fish, wildlife, and associated habitats in the Central Valley. This could also be considered as system-wide use and improve the operational flexibility of the CVP.

**Wildlife Habitat Improvements.** Wildlife habitats will be improved and protected by developing terrestrial, aquatic and wildlife-friendly agricultural habitats on Holland Tract and Bouldin Island.

### Other Benefits

**Flood Damage Reduction.** Diversions to the reservoir islands would occur during high flow season, lowering flood levels in adjoining channels and reducing the risk of flooding to neighboring islands. Storage space could be increased by releasing water from the reservoirs before the expected flood peak arrives.

**Seismic Stability.** The embankments would withstand higher magnitude earthquakes compared to existing levees, reducing the chance of embankment failure and associated saltwater inflow from the Bay. In case of a seismic failure of adjoining islands, the reservoirs could release fresh water to repel salt water.

**Recreational Opportunities.** The proposed reservoir and habitat islands could provide more public recreation in the Delta. Recreational opportunities could include hunting, fishing, hiking, biking, and interpretative experiences and have a positive effect on local economy.

## Project Operations

The newly configured In-Delta Storage Project operations could be coordinated with the SWP and CVP system operations. The total storage capacity of the two reservoir islands is 217 TAF. However, existing State Water Resources Control Board permit allows the reservoirs to fill and release up to 822 TAF per year. This could allow reservoir operations to be used for multiple purposes and could provide flexibility of SWP and CVP operations. In addition to existing D1641 requirements, In-Delta Storage is required to comply with the Delta Wetlands permit conditions as stated in SWRCB Water Rights Decision 1643.

The proposed In-Delta Storage Project could store and distribute water for possible uses as stated in the CALFED ROD. While In-Delta Storage could be operated in a wide variety of ways for differing benefits, three sample operational scenarios were developed to provide examples of the types and magnitudes of potential benefits possible from the project. One scenario emphasizes water supply, one scenario emphasizes water supply and the EWA, and one scenario emphasizes water supply, EWA, and ERP Delta flows. These sample scenarios could provide average annual water quantity benefits ranging from 124,000 to 136,000 acre-feet over the long-term and from 59,000 to 62,000 acre-feet during dry periods. Applying organic carbon constraints and application of the biological opinion criteria related to the low delta smelt abundance index could reduce project benefits by 10,000 to 20,000 acre-feet. Many other operational scenarios, with different assumptions





**Bouldin Island  
Habitat**

and emphases, are possible. A final operations plan would be developed based on input from potential beneficiaries.

Other storage projects being studied for the Bay-Delta Program have not yet progressed far enough in the process to have their own assigned operational requirements similar to D1643 for In-Delta Storage. It is interesting to note that the In-Delta Storage Project could deliver about 100,000 acre-feet more benefits if it was not required to operate under the D1643 constraints.

## Project Costs and Benefits

Both capital and annual costs were estimated for the project. The total capital cost of the project, including construction, engineering, legal, administration, permitting, land acquisition, relocations, and allowance for contingencies is estimated to be approximately \$774 million. The equivalent annual cost is estimated at approximately \$60 million.

While In-Delta Storage could be operated in a wide variety of ways for differing benefits, no specific operational scenario has been chosen by potential beneficiaries. In addition to approximately \$23 to 26 million in water supply benefits, there are many benefits such as operational flexibility, water quality improvements, wildlife habitat improvements and seismic stability for Delta levees that have not yet been quantified. Also, additional benefits would come from recreation, flood damage reduction and avoided levee maintenance. Before total project benefits and cost can be compared, value must

be assigned to these benefits. All potential project participants, including the State, must use judgment to estimate the value of the benefits the In-Delta Storage Project might provide and determine if those benefits justify the project costs. The Department will work with the Bay-Delta Public Advisory Committee and the California Bay-Delta Authority to gather input from interested parties before completing this benefits assessment.

## Environmental Affects and Mitigation Measures

Environmental effects of the proposed project have been evaluated and mitigation measures have been identified to reduce these impacts. Further consultations with regulatory and resource agencies would be required during preparation of additional environmental documents. A summary of the key environmental resource categories follows:

***Aquatic resources.*** River side embankment work could eliminate some of the shallow water habitat. This habitat could be replaced at other sites. Consultation and coordination with fish and wildlife agencies would help develop mitigation measures.

***Listed or sensitive fish species.*** Construction impact mitigation measures, operating rules and state-of-the-art fish screens are proposed and would be refined to minimize effects to aquatic species. These measures would be developed and refined in consultation with the fishery agencies when design, operation and construction details are developed.

## Program Schedule

### 1999–2001

- CALFED ROD identifies In-Delta Storage as a project to pursue.
- Reclamation and DWR begin preliminary appraisals and evaluations.

### 2001–2002

- Joint DWR/Bay Delta Authority Planning Study, with technical assistance from Reclamation.

### 2002–2004

- State Feasibility Study completed.
- Draft feasibility reports released for review.
- Public reviews and comments.

### 2004–2005

- BDPAC and Authority recommendations.
- Complete final State Feasibility Study.
- Initiate CEQA/NEPA process if decision is made to move forward.
- Complete EIR/EIS by December 2005.
- Petition SWRCB to change water right permit and obtain other permits before project construction.

*Water quality.* A water quality management plan prevents releasing water that would degrade the beneficial uses of Delta water. Measures to avoid and mitigate construction impacts would be developed in consultation with the water quality agencies when design, operation and construction details are developed.

*Recreation activities.* Mitigation measures to replace and enhance recreational uses at the project would be included to help satisfy recreational needs in the Delta.

*Cultural resources.* A cultural resources agreement would be the basis for re-initiating National Historic Preservation Act consultations and conducting additional surveys and data recovery excavations.

*Agricultural lands.* The feasibility of acquiring agricultural easements to mitigate impacts to agricultural lands is being investigated. The project habitat islands would contain some lands for wildlife-friendly agricultural uses.

*Special status plants.* Mitigation measures would include protecting plants from construction and recreational impacts, locating facilities to avoid plants, transplanting plants to protected areas and protecting, enhancing and creating special plant habitat off-site.

*Special status wildlife.* Habitat lost by storing water on the reservoir islands would be mitigated by replacing it on the project habitat islands.

*Hazardous materials.* Hazardous materials would be removed or treated before the islands are used for either reservoir storage or habitat purposes.

## CONCLUSIONS

- The Project construction and operation are feasible with an acceptable level of risk of structural failure and minimal potential for loss-of-life.
- Additional water quality field and modeling evaluations are necessary to refine project operations for organic carbon, dissolved oxygen and temperature. The recent studies indicate that circulating fresh water through the reservoirs could be effective mitigation to resolve the organic carbon issue. A final field investigations and modeling plan should be developed with recommendations from the CALFED Science Panel Review.
- The In-Delta Storage Project could provide significant improvement in the flexibility of Delta water operations.
- DWR estimates the equivalent annual cost for the In-Delta Storage Project at approximately \$60 million. While In-Delta Storage could be operated in a wide variety of ways for differing benefits, no specific operational scenario has been chosen by potential beneficiaries. In addition to approximately \$23 to 26 million in water supply benefits, there are many benefits such as operational flexibility, water quality improvements, wildlife habitat improvements and seismic stability for Delta levees that have not yet been quantified. Also, additional benefits would come from recreation, flood damage reduction and avoided levee maintenance. Before total project benefits and cost can be compared, value must be assigned to these benefits. All potential project participants, including the State, must use judgment to estimate the value of the benefits the In-Delta Storage Project might provide and determine if those benefits justify the project costs. The Department will work with the Bay-Delta Public Advisory Committee and the California Bay-Delta Authority to gather input from interested parties before completing this benefits assessment.

If it is determined to proceed with the In-Delta Storage Program, further work is required to comply with the California Environmental Quality Act and National Environmental Policy Act.

The California Bay-Delta Program implementing agencies, other public agencies, stakeholders and the public will have the opportunity to participate in the environmental process.





**Review and Comment Information:**

The In-Delta Storage Program planning and feasibility level studies produced numerous detailed documents that describe all aspects of the proposed In-Delta Storage Project. If you would like to review these documents, please visit the web site listed below.

California Bay-Delta Program:  
[www.calwater.ca.gov](http://www.calwater.ca.gov)

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